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Awareness and rates of vaccination in hemodialysis patients

Raziye Yazıcı[1], İbrahim Güney[2], Atila Yürekli[3], Selver Can[4]

[1]Department of Nephrology, Konya Beyhekim Training and Research Hospital, Konya, Turkey
[2]Department of Nephrology, University of Health Sciences, Konya City Hospital, Konya, Turkey
[3]Hemodialysis Physician, Konya Ölmez Dialysis Center, Konya, Turkey
[4]Department of Infectious Disease, Konya Beyhekim Training and Research Hospital, Konya, Turkey

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ABSTRACT

Aims: Vaccination is main risk reducing strategy for vaccine-preventable infections in chronic kidney disease (CKD) patients, but vaccination rates in hemodialysis patients are not at the desired level. In this study, we aimed to search the rates of influenza, pneumococcal, hepatitis B and coronavirus disease-2019 (COVID-19) vaccination, the vaccination awareness and the reasons for not taking vaccination in hemodialysis patients.

Methods: In this cross-sectional study, 232 CKD patients undergoing hemodialysis in two centers for at least six months were included. The patients completed the questionnaire about vaccination. The data about patients' history of vaccination regarding influenza, pneumococcal, hepatitis B and COVID-19 vaccines; patients' attitudes and knowledge about vaccination; the source of information about vaccination were collected via this questionnaire.

Results: The rates of pneumococcal, influenza, hepatitis B and COVID-19 vaccination were 9.9%, 56.6%, 38.8% and 87.1%, respectively. In patients with missing vaccination, the main reasons for not taking vaccination were lack of knowledge about vaccination (48.7%), the thought that the vaccine is not beneficial (12.5%) and fear of adverse effects (3.4%). The main sources of information about vaccination were healthcare workers (90.5%), radio/televison (1.7%) and internet (1.7%).

Conclusion: Our findings showed that the rates of influenza, pneumococcal and hepatitis B vaccination were below the targeted levels and the main reason was the lack of information about vaccination and the main source of information about vaccination was health personnel. Strategies should be developed to increase the awareness and rate of vaccination for vaccine-preventable infections in CKD patients.

Keywords: Awareness, hemodialysis, vaccination, chronic kidney disease

INTRODUCTION

Chronic kidney disease (CKD) is an important public health problem and it affects approximately 8-16% of adults worldwide.[1] CKD patients are more prone to infections. This may be due to impaired immune function, immunosuppressive therapies, dialysis-related causes, increased hospitalization rates, advanced age or comorbidities such as diabetes.[2,3]

In hemodialysis patients, infectious diseases are the second most common cause of mortality after cardiovascular disease; and infectious diseases, also, contribute to increased hospitalization rates.[2] Preventing a disease is always much more effective, easier and cost-effective process than treatment of it. Vaccination is among the most tremendous discoveries in human history and it has saved millions of lives to date. It is one of the most effective tool to prevent infectious diseases in CKD patients.[4] Some infection types, such as hepatitis B, influenza and pneumococcal infections, are preventable via vaccinations. So, vaccine recommendations are main risk reducing strategy for vaccine-preventable infections in CKD patients.[3]

Influenza vaccination is important for high risk population such as older adults or individuals with chronic conditions; it reduces the risks of influenza infection-related complications by 20-40% in the general population with relatively reduced effectiveness in advanced CKD patients.[3] Annual influenza vaccination is recommended to all adult CKD patients who have no contraindication.[5]

Pneumococcal vaccination is effective to prevent infections caused by *Streptococcus pneumoniae*.[3] Pneumococcal vaccination and revaccination within 5 years, is recommended to adult patients with eGFR <30 ml/min/1.73 m².[5]

Corresponding Author: Raziye Yazıcı, drraziye42@hotmail.com

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Hemodialysis patients have increased risk for blood-borne pathogen exposure.[4] Hepatitis B virus (HBV) infection in hemodialysis patients tends to be chronic more often compared with that of non-uremic patients (30%-60% vs 10%).[2] The rates of HBV infection among hemodialysis patients can be decreased by vaccination and additional precautions, such as screening for hepatitis B in dialysis centers, decreasing transfusions by using erythropoietin, segregation of the equipment of seropositive patients.[2,4] CKD patients may have poor response to hepatitis B vaccine.[4] Immunization against HBV and the response confirmation by serological tests is recommended to CKD patients including hemodialysis patients.[5]

The development of Severe Acute Respiratory Syndrome-Coronavirus-2 (SARS-CoV-2) vaccination had important role in controlling spread of Coronavirus disease-2019 (COVID-19) infection and decreasing symptomatic form of disease.[6] Hemodialysis patients had increased risk of COVID-19 infection with increased hospitalization and mortality rates compared to general population and SARS-CoV-2 vaccination had protective role in this susceptible population.[7]

Although vaccination is most effective tool to prevent vaccine-preventable infectious diseases, it may be overlooked and vaccination rates in hemodialysis patients are still below the desired level and CKD patients remain somewhat under-vaccinated.[2,4] This may be due to efficacy concerns, ineffective reminder systems, time constraints, financial and health care access status, lack of knowledge or incorrect knowledge about vaccine (about its importance, adverse effects, etc.), or patients' thoughts about vaccines which may lead to vaccine rejection, reluctance or hesitancy.[2,8-10] There are limited number of study investigating the awareness about vaccination, attitude towards vaccination and the vaccination rates among hemodialysis patients. In this study, we aimed to search the rates of influenza, pneumococcal, hepatitis B and COVID-19 vaccination, the vaccination awareness, the reasons for not taking vaccination and the sources of information about vaccination among hemodialysis patients.

METHODS

The study was carried out with the permission of KTO Karatay University Faculty of Medicine Non-medicine and Non-medical Device Researches Ethics Committee (Date: 29.12.2022, Decision No: 2022/009). All procedures were carried out in accordance with the ethical rules and the principles of the Declaration of Helsinki. Written consent was obtained from the patients participating in this study.

In this cross-sectional study, CKD patients (aged >18 years) undergoing hemodialysis in two centers for at least six months were included and the study was carried out between January 1, 2023 and January 31, 2023. Patients with neurological or psychological disabilities or who could not answer the survey questions were excluded. Written informed consent was obtained from the patients participating in the study.

Patients' demographical and clinical data including age, gender, occupation, educational status, comorbidities, the date when hemodialysis was initiated, etiologies of CKD and laboratory findings were obtained from the patient files. The patients who met the inclusion criteria and who agreed to participate in the study completed the questionnaire form structured based on the objectives of this study. The data about socio-demographic characteristics of patients; patients' history of vaccination regarding influenza, pneumococcal, hepatitis B and COVID-19 vaccines; patients' attitudes and knowledge about vaccination; the source of information about vaccination were all collected via this questionnaire.

Statistical Analysis

Statistical analyses of data were performed using Statistical Package for Social Sciences for Windows version 22 (SPSS 22) program. Descriptive tests such as frequency and descriptive statistics were used to evaluate the data.Continuous variables were expressed as mean ± standard deviation, categorical variables were reported as frequency and percentage.

RESULTS

In this study, 232 hemodialysis patients (108 female, 46.6%; 124 male, 53.4%) were included. Patients' mean age was 57±14. Of the patients, 174 (75.0%) were married. The education level of 168 patients (72.4%) was primary school and 39 patients (16.8%) were illiterate. Data regarding patients' occupations were as follows: 102 patients (44.0%) were housewife; 52 patients (22.4%) were retired; 22 patients (9.5%) were unemployed; 36 patients (15.5%) were working in their own workplace; 20 patients (8.6%) were employee. Most of the patients (92.7%) lived in the city center; 17 patients (7.3%) lived in the village. CKD etiologies of these patients were diabetes mellitus (66 patients, 28.4%), hypertension (60 patients, 25.9%), polycystic kidney disease (18 patients, 7.8%), glomerulonephritis (10 patients, 4.3%), urological causes (18 patients, 7.8%), amyloidosis (2 patients, 0.9%) and unknown underlying etiologies (58 patients, 25.0%). Of the patients, 53 (22.8%) had smoking history. Demographic and clinical characteristics of the patients were summarized in **Table 1**.

Table 1. Demographic and clinical characteristics of the patients

Parameters	
Age, year, mean±SD	57±14
Gender, n (%)	
Female	108 (46.6)
Male	124 (53.4)
Marital status, n (%)	
Married	174 (75.0)
Single	58 (25.0)
Educational status, n (%)	
Illiterate	39 (16.8)
Primary school graduate	168 (72.4)
High school graduate	16 (6.9)
University graduate	9 (3.9)
Occupation, n (%)	
Housewife	102 (44.0)
Retired	52 (22.4)
Self-employed	36 (15.5)
Employee	20 (8.6)
Unemployed	22 (9.5)
Location, n (%)	
City center	215 (92.7)
Village	17 (7.3)
CKD etiology, n (%)	
Diabetes mellitus	66 (28.4)
Hypertension	60 (25.9)
Polycystic kidney disease	18 (7.8)
Urological causes	18 (7.8)
Glomerulonephritis	10 (4.3)
Amyloidosis	2 (0.9)
Unknown	58 (25.0)

SD, standart deviation; CKD, chronic kidney disease.

Regarding vaccination rates, 129 patients (56.6%) were vaccinated with influenza vaccine; 23 patients (9.9%) were vaccinated with pneumococcal vaccine; 202 patients (87.1%) were vaccinated with COVID-19 vaccine and 90 patients (38.8%) were vaccinated with hepatitis B vaccine and completed hepatitis B immunization schedule. Hepatitis B surface antigen (HBsAg) was positive in 5 patients (2.2%). Data regarding vaccinaton history of the patients were shown in Table 2.

Table 2. The rates of influenza, pneumococcal, hepatitis B and COVID-19 vaccination of the patients

Vaccine	n (%)
Influenza	
Vaccinated	129 (56.6)
Pneumococcal	
Vaccinated	23 (9.9)
Hepatitis B	
Vaccinated	90 (38.8)
Immune due to natural infection	85 (36.6)
HBsAg positive	5 (2.2)
COVID-19	
Vaccinated, at least one dose (or more)	202 (87.1)
Vaccinated, two doses	68 (29.3)
Vaccinated, three doses	74 (31.9)
Vaccinated, four doses	33 (14.2)
Vaccinated, five doses	14 (6.0)
Vaccinated, six doses	3 (1.3)

In patients with missing vaccination, the main reasons for not taking vaccination were lack of knowledge about vaccination (113 patients, 48.7%), the thought that the vaccine is not beneficial (29 patients, 12.5%), fear of adverse effects (8 patients, 3.4%), lack of information on vaccination timing (5 patients, 2.2%), having allergy (2 patients, 0.9%) and other reasons (56 patients, 24.1%) (Table 3).

Table 3. The reasons for not taking vaccination

	n (%)
Lack of knowledge about vaccination	113 (48.7)
The thought that the vaccine is not beneficial	29 (12.5)
Fear of adverse effects	8 (3.4)
Lack of information on vaccination timing	5 (2.2)
Having allergy	2 (0.9)
Other	56 (24.1)

The sources of information about vaccination were healthcare workers (210 patients, 90.5%), radio/televison (4 patients, 1.7%), internet (4 patients, 1.7%), family/relatives (3 patients, 1.3%), and other sources (11 patients, 4.7%) (Table 4).

Table 4. The sources of information about vaccination

	n (%)
Health personnel	210 (90.5)
Radio/television	4 (1.7)
Internet	4 (1.7)
Family/relatives	3 (1.3),
Other	11 (4.7)

DISCUSSION

Knowing the fact that prevention of a disease is always more effective and easier than treatment, vaccination is crucial for primary prevention and it is main risk reducing tool for vaccine-preventable diseases in CKD patients.[3] Vaccination rates in hemodialysis patients are not at the targeted level.[11,12] There are limited number of study about the vaccination rates and the awareness of vaccination in hemodialysis patients. In this study, the rates of pneumococcal, influenza, hepatitis B and COVID-19 vaccination were 9.9%, 56.6%, 38.8% and 87.1%, respectively. In previous studies, different rates of vaccination were reported in hemodialysis patients: In the study of Mutlu et al.[13] the rates of pneumococcal and influenza vaccination were reported as 14.4% and 51.4% respectively, whereas these rates in the study of Günay et al.[9] were 3.3% and 18.3%, respectively. These different findings between studies may be due to differences in the study population (different sample size or different socio-economical or educational status, etc.) and/or due to lack of standardized vaccination practice. In a study

from Nigeria, only 5.7% of patients had completed the hepatitis B vaccination schedule and this was attributed to poor awareness.[14] In the study of Günay et al.[9] rate of hepatitis B vaccination was 75%, higher than that of other vaccines, and the authors attributed this to considering of hepatitis B vaccination as a generally accepted routine practice and to the fact that patients had more knowledge about hepatitis B vaccination. Lower rates of hepatitis B vaccination in our study may be due to the fact that the patients avoided going out during the pandemic period and other vaccine recommendations such as COVID-19 and influenza, come to the fore during this period. In addition, 36.6% of our patients were immune due to natural hepatitis B infection. COVID-19 vaccination acceptability was 58.3% in Egyptian survey study among hemodialysis patients.[15] COVID-19 vaccination uptake was 77.5% in another study.[16] In our study, COVID-19 vaccination rate was 87.1%. The higher rate of COVID-19 vaccination compared with other vaccines in our study population can be attributed to getting more information about COVID-19 disease and COVID-19 vaccines via media, internet and healthcare workers and to the fear of COVID-19 infection which could be fatal outcomes.

In our study, the main reasons for not taking vaccination were lack of knowledge and misconceptions about vaccines; and the main sources of information about vaccination were health personnel. Similar to our study, in three previous studies, the main reason for not being vaccinated was the lack of knowledge.[9,13,14] Vaccination rates may be increased only by providing hemodialysis patients with detailed information. Similar to our study, in a previous study, the main source of information was health personnel.[13] The recommendations made by physicians (family physician or nephrologist) might be more effective.[13] So, according to these findings, the role of the health personnel, especially physicians, is important in increasing vaccination rates (i.e., in increasing primary prevention) in hemodialysis patients.[9,13] A health policy on this issue, a standardized vaccination practice in hemodialysis centers, education of health personnel and cooperation between family physician and nephrologist can contribute to increase vaccination rates.[13]

There are some limitations of our study. First, our study group consisted of a limited number of patients from two dialysis centers. Second, education levels of most of our patients (89.2%) were primary school or illiterate. So, the thoughts about vaccines, vaccination rates or sources of informations may be different in the patients groups with higher education level.

CONCLUSION

Our findings showed that the rates of influenza, pneumococcal and hepatitis B vaccination were below the targeted levels and the main reason for this was the lack of information about vaccination and the main source of information about vaccination was health personnel. Strategies to increase the vaccination rate, is important in reducing vaccine-preventable diseases in CKD patients. Further multi-center studies with larger populations are needed.

ETHICAL DECLARATIONS

Ethics Committee Approval: The study was carried out with the permission of KTO Karatay University Faculty of Medicine Non-medicine and Non-medical Device Researches Ethics Committee (Date: 29.12.2022, Decision No: 2022/009).

Informed Consent: Written consent was obtained from the patients participating in this study.

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